

ECONOMIES OF SCALE IN INTENSIVE CARE UNITSRapoport J¹, Edbrooke D², Jacobs P³, Dean J²¹Mount Holyoke College, South Hadley, MA, USA; ²Royal Hallamshire Hospital, Sheffield, United Kingdom; ³Institute of Health Economics, Edmonton, Alberta, Canada

OBJECTIVES: Understanding factors associated with the average cost of providing critical care, particularly size of unit, is important for many policy decisions. Study of possible economies of scale, i.e. decrease in average cost with increased size of unit, has been limited due to a lack of valid cost data collected on a uniform basis. This study uses a cost database in which data from a group of 75 U.K. critical care units are held, collected using consistent definitions. It estimates the extent of scale economies controlling for other relevant critical care unit characteristics.

METHODS: Annual costs for 75 British critical care units were obtained using a cost accounting system based on specific costs of resource inputs and prices. Cost categories included staff costs, consumables and clinical support services. Multiple regressions using cost per patient day as the dependent variable and log of unit size (number of beds) as the major independent variable were performed. Separate regressions were estimated for each of the cost categories as well as for total costs. **RESULTS:** Median unit size was 6 beds (IQR 4.9 to 8 beds). Median total cost per patient day was £955 pounds (IQR £884 to £1105 pounds). A statistically significant negative relationship between total cost per patient day and unit size was found ($p < .001$, adjusted R-squared = .33). The size coefficient was also negative in the regression for each cost component, and was statistically significant in the equations for staff and consumables costs. **CONCLUSIONS:** Average costs per patient day in British critical care units decline with increased size of unit. The likelihood of scale economies should be considered in facilities planning, cost projection and budgeting, and economic evaluation of policy proposals.

SESSION IV**OUTCOMES RESEARCH METHODOLOGY ISSUES II****CHANGES IN COST-EFFECTIVENESS OVER TIME: THE CASE OF EPOETIN ALFA FOR RENAL REPLACEMENT THERAPY PATIENTS IN THE UK**Remak E¹, Hutton J¹, Zagari M²¹MEDTAP International, London, UK; ²Ortho-Biotech, UK/Ireland, High Wycombe, United Kingdom

OBJECTIVES: To analyse the factors influencing cost-effectiveness of a health care intervention over time using economic evaluations of epoetin alfa (EPO) as a case study. When first evaluated, EPO was not considered cost-effective in the UK, but soon became widely used by

HS3

clinicians. **METHODS:** The analytical framework of a study conducted in 1990 was used to revisit the cost-effectiveness of EPO. Study variables were updated to 2000 values using a meta-analysis of the impact of EPO on key cost drivers, supplemented by published unit cost data and expert clinical opinion. Utilities for health states associated with anaemia were taken from published studies. The impact of the change in the value of each variable on the cost-effectiveness ratio was assessed separately. **RESULTS:** After 10 years further experience of the use of EPO the base case cost per QALY was reduced from £171,810 to £17,067 (at 2000 prices), now falling in the range considered acceptable by the National Institute for Clinical Excellence (NICE). The majority of the reduction resulted from changes in the dosage and price of EPO since 1990. Other factors making a sizeable contribution were the revised QALY gains and the use of the changed UK discount rate. Only one factor, the reduced estimate of avoidance of transfusions, caused an increase in the cost-effectiveness ratio since 1990. **CONCLUSIONS:** Cost-effectiveness can change over time with improved data collection and changes in the utilisation and cost of technologies. The existence of a body like NICE in 1990 might have delayed the widespread adoption of EPO in the UK, but the higher standards of clinical and economic evidence demanded by such a body might have expedited the appropriate pricing, dosage and utilisation of the treatment. Whilst the factors inducing the improved cost-effectiveness of EPO were identified in the sensitivity analysis in 1990, the subsequent changes could not easily be predicted at the time of the early evaluation.

MD5**SHOULD THE EUROQOL DESCRIPTIVE SYSTEM BE EXTENDED FROM THREE TO FIVE LEVELS? A METHODOLOGICAL STRATEGY WITH AN EMPIRICAL PILOT**

Janssen MF, Bonsel GJ

Academic Medical Centre, Amsterdam, Netherlands

OBJECTIVES: The EuroQol-5D3L (= 3 levels) is the most widely used health state instrument to calculate QALYs. A major weakness, however, is lack of discrimination as a result of only three levels within each domain. Applying QALYs in pharmacoeconomics may be hampered when expected health gains are significant, but small. We established a formal approach to measure the gain of a 5 instead of 3 level EuroQol system, leaving the domains unaltered. Construct validity, information gain (using a quantification system), and reliability were established. **METHODS:** Forty-six patients with heterogeneous diseases ($n = 46$) filled out the EuroQol questionnaire and a visual analogue scale (VAS) twice, with a 1-day interval. Patients were randomly assigned to the 3 or 5 level version each occasion, thus creating four combinations of EuroQol pairs between subjects (3-3, 3-5, 5-3 & 5-5). The 5 level wording was discussed within the EuroQol

MD4